

UNIT 4: EMERGENCY MEDICAL OPERATIONS—PART 2

In this unit you will learn about:

- Public Health Considerations: How to maintain hygiene and sanitation.
- Functions of Emergency Medical Operations: How to conduct the four major subfunctions of emergency medical operations.
- Disaster Medical Treatment Areas: How to establish them and what their functions are.
- Patient Evaluation: How to perform a head-to-toe patient evaluation to identify and treat injuries.
- Basic Treatment—How To:
 - Treat burns.
 - Dress and bandage wounds.
 - Treat fractures, dislocations, sprains, and strains.
 - Apply splints to hands, arms, and legs.
 - Treat hypothermia.
 - Control nasal bleeding.

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INTRODUCTION AND UNIT OVERVIEW

This unit will cover:

- Public health concerns related to sanitation, hygiene, and water purification.
- Organization of disaster medical operations.
- Establishing treatment areas.
- Conducting head-to-toe assessments.
- Treating wounds, fractures, sprains, and other common injuries.

OBJECTIVES

At the end of this unit, you should be able to:

- Take appropriate sanitation measures to protect the public health.
- Perform head-to-toe patient assessments.
- Establish a treatment area.
- Apply splints to suspected fractures and sprains, and employ basic treatments for other wounds.

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PUBLIC HEALTH CONSIDERATIONS

When disaster victims are sheltered together for treatment, public health becomes a concern. Measures must be taken, both by CERT members and programmatically, to avoid the spread of disease.

The primary public health measures include:

- Maintaining proper hygiene.
- Maintaining proper sanitation.
- Purifying water (if necessary).

MAINTAINING HYGIENE

Maintenance of proper hygiene is critical even under makeshift conditions.

Some steps that individual workers can take to maintain hygiene are to:

- Wash hands frequently using soap and water. Hand washing should be thorough (at least 12 to 15 seconds) with an antibacterial scrub if possible.
- Wear latex gloves at all times. Change or disinfect gloves after examining and/or treating each patient. As explained earlier, under field conditions, workers can use rubber gloves that are sterilized between treating victims using bleach and water (1 part bleach to 10 parts water).
- Wear a mask and goggles. If possible, wear a mask that is rated "N95."
- Keep dressings sterile. Do not remove the overwrap from dressings and bandages until use. After opening, use the entire dressing or bandage, if possible.
- Avoid contact with body fluids. Thoroughly wash areas that come in contact with body fluids with soap and water or diluted bleach as soon as possible.

MAINTAINING SANITATION

Poor sanitation is also a major cause of illness, disease, and death.

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PUBLIC HEALTH CONSIDERATIONS (CONTINUED)

CERT medical operations personnel can maintain sanitary conditions by:

- Controlling the disposal of bacterial sources (e.g., latex gloves, dressings, etc.).
- Putting waste products in plastic bags, tying off the bags, and marking them as medical waste. Keep medical waste separate from other trash, and dispose of it as hazardous waste.
- Burying human waste.

WATER PURIFICATION

Potable water supplies are often in short supply or are not available in an extreme emergency. Purify water for drinking, cooking, and medical use by heating it to a rolling boil for 1 minute, or by using water purification tablets or unscented liquid bleach.

Rescuers should not put anything on wounds other than purified water. The use of other solutions (e.g., hydrogen peroxide) on wounds must be the decision of trained medical personnel.

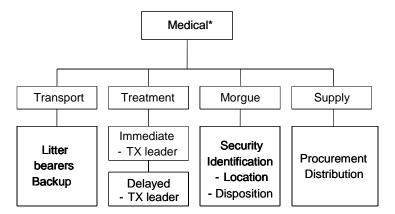
CERT members <u>must use latex gloves</u>, <u>goggles</u>, <u>and a mask during all medical operations</u>, and they must cover all open wounds as a way of preventing the spread of disease.

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FUNCTIONS OF DISASTER MEDICAL OPERATIONS

There are four major subfunctions of disaster medical operations:

- <u>Triage</u>: The initial assessment and sorting of victims for treatment based on the severity of their injuries
- Treatment: The area in which emergency medical services are provided to victims
- <u>Transport</u>: The movement of victims from the triage area to the treatment area. If professional help will be delayed, for efficiency of operations, victims can be transported to the treatment area by CERT members
- Morgue: The temporary holding area for victims who have died as a result of their injuries



Disaster Medical Operations Organization

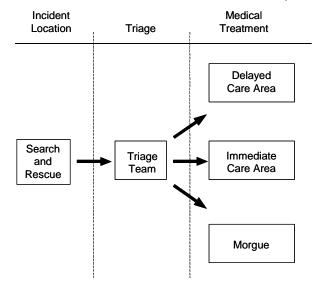
Disaster Medical Operations Organization, showing the subfunctions of disaster medical operations: Transport, Treatment, Morque, and Supply.

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^{*} Note that triage is organized under search and rescue.

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FUNCTIONS OF DISASTER MEDICAL OPERATIONS (CONTINUED)



Patient Flowchart

Patient Flowchart, which shows how the patients are rescued, triaged, and sent to the medical treatment areas according to the extent of their injuries ("I," "D," or "Dead").

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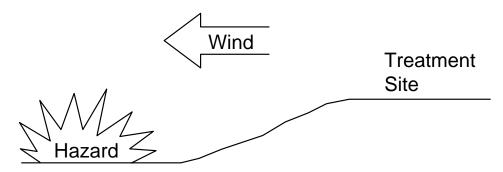
ESTABLISHING TREATMENT AREAS

Because time is critical during an emergency, CERT medical operations personnel will need to select a site and set up a treatment area as soon as injured victims are confirmed.

The treatment area is the location where the most advanced medical care possible will be given to victims.

The site selected should be:

- In a safe area, free of hazards and debris.
- Close to, but upwind and uphill from, the hazard zone(s).
- Accessible by transportation vehicles (ambulances, trucks, helicopters, etc.).
- Expandable.



Treatment Area Site Selection

Treatment Area Site Selection, uphill and upwind from hazard.

TREATMENT AREA LAYOUT

The treatment area must be protected and clearly delineated using a ground cover or tarp, and signs should identify the subdivisions of the area:

- "I" for Immediate care
- "D" for Delayed care
- "DEAD" for the morgue

The "I" and "D" divisions should be relatively close to each other to allow:

- Verbal communication between workers in the two areas.
- Shared access to medical supplies (which should be cached in a central location).
- Easy transfer of patients whose status has changed.

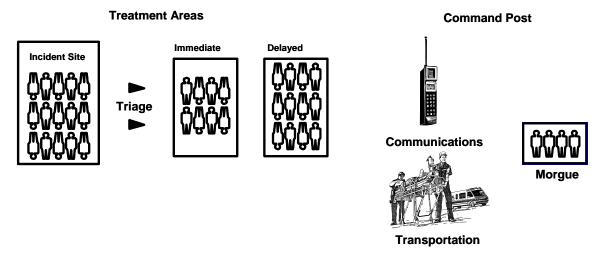
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ESTABLISHING TREATMENT AREAS (CONTINUED)

A clearly marked treatment area will help in transporting victims to the correct location.

Patients in the treatment area should be positioned in a head-to-toe configuration, with two to three feet between victims.



Treatment Area Layout

Treatment Area Layout, showing the organization for the incident site, triage, communications, transportation, and morgue.

This system will provide:

- Effective use of space.
- Effective use of available personnel. (As a worker finishes one head-to-toe assessment, he or she turns around and finds the head of the next patient.)

TREATMENT AREA ORGANIZATION

The CERT team must assign leaders to maintain control in each of the medical treatment areas. These leaders will:

- Ensure orderly victim placement.
- Direct assistants to conduct head-to-toe assessments.

COMMUNITY EMERGENCY RESPONSE TEAM UNIT 4: EMERGENCY MEDICAL OPERATIONS—PART 2

ESTABLISHING TREATMENT AREAS (CONTINUED)

Thoroughly document victims in the treatment area, including:

- Available identifying information.
- Description (age, sex, body build, height, weight).
- Clothing.
- Injuries.
- Treatment.
- Transfer location.

TREATMENT AREA PLANNING

Remember to plan before disaster strikes, including:

- Roles of personnel assigned to the treatment area.
- Availability of setup equipment needed, such as ground covers/tarps and signs for identifying divisions (immediate, delayed, morgue).

Take part in practice exercises so that you can develop a good operational plan and practice rapid treatment area setup.

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CONDUCTING HEAD-TO-TOE ASSESSMENTS

The first steps that you will take when working with a victim will be to conduct a triage and rapid treatment. After all victims in an area have been triaged CERT members will begin a thorough head-to-toe assessment of the victim's condition.

During triage, you looked for "the killers."

- Airway obstruction.
- Excessive bleeding.
- Signs of shock.

A head-to-toe assessment goes beyond the "killers" to try to gain more information to determine the nature of the victim's injury. During a head-to-toe assessment, look for the following:

- Bruising.
- Swelling.
- Severe pain.
- Disfigurement.

A head-to-toe assessment can be done in place in a lightly damaged building. If the building is moderately damaged, the victim should be moved to a safe zone or to the treatment area for the head-to-toe assessment.

The objectives of a head-to-toe assessment are to:

- Determine, as clearly as possible, the extent of injuries.
- Determine what type of treatment is needed.
- Document injuries.

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CONDUCTING HEAD-TO-TOE ASSESSMENTS (CONTINUED)

Wear safety equipment when conducting head-to-toe assessments.

Head-to-toe assessments should be:

- Conducted on all victims, even those who seem alright. Everyone gets a tag.
- Verbal (if the patient is able to speak).
- Hands-on.

Whenever possible, you should ask the person about any injuries, pain, bleeding, or other symptoms. If the victim is conscious, CERT members should always ask permission to conduct the assessment. The victim has the right to refuse treatment. Then:

- Pay careful attention.
- Look, listen, and feel for anything unusual.

Conduct head-to-toe assessments systematically, checking body parts from the top to the bottom for continuity of bones and soft tissue injuries in the following order:

- 1. Head
- 2. Neck
- 3. Shoulders
- 4. Chest
- 5. Arms
- 6. Abdomen
- 7. Pelvis
- 8. Legs
- 9. Back

Completing the assessment in the same way every time will make the procedure quicker and more accurate.

Check your own hands for patient bleeding as you complete the head-to-toe assessment.

Perform an entire assessment before beginning any treatment. Also, treat all unconscious victims as if they have a spinal injury.

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CONDUCTING HEAD-TO-TOE ASSESSMENTS (CONTINUED)

CLOSED-HEAD, NECK, AND SPINAL INJURIES

When conducting head-to-toe assessments, rescuers may come across victims who have or may have suffered closed-head, neck, or spinal injuries.

The main objective when CERT members encounter suspected injuries to the head or spine is to <u>do no harm</u>. You should minimize movement of the head and spine, while treating any other life-threatening conditions.

The signs of a closed-head, neck, or spinal injury most often include:

- Change in consciousness.
- Inability to move one or more body parts.
- Severe pain or pressure in the head, neck, or back.
- Tingling or numbness in extremities.
- Difficulty breathing or seeing.
- Heavy bleeding, bruising, or deformity of the head or spine.
- Blood or fluid in the nose or ears.
- Bruising behind the ear.
- "Raccoon" eyes (bruising around eyes).
- "Uneven" pupils.
- Seizures.
- Nausea or vomiting.
- Victim found under collapsed building material or heavy debris.

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CONDUCTING HEAD-TO-TOE ASSESSMENTS (CONTINUED)

If the victim is exhibiting any of these signs, he or she should be treated as having a closed-head, neck, or spinal injury.

Keep the spine in a straight line when doing the head-to-toe assessment.

In an extreme emergency, ideal equipment is rarely available, so the CERT members may need to be creative by:

- Looking for materials that can be used as a backboard—a door, desktop, building materials—anything that might be available.
- Looking for items that can be used to stabilize the head on the board—towels, draperies, or sandbags—by tucking them snugly on either side of the head to immobilize it.

EXERCISE: CONDUCTING HEAD-TO-TOE ASSESSMENTS

<u>Purpose</u>: This exercise allows you to practice conducting head-to-toe assessments.

Instructions: Follow the steps below to complete this exercise:

- 1. Work in two-person teams of victim and rescuer.
- 2. Victims should lie on the floor on their backs and close their eyes.
- 3. The rescuer should conduct a head-to-toe assessment on the victim following the procedure demonstrated earlier.
- 4. After the rescuer has made at least two observed head-to-toe assessments, the victim and rescuer should change roles.

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TREATING BURNS

The objectives of first aid treatment for burns are to:

- Cool the burned area.
- Cover with a sterile cloth to reduce the risk of infection (by keeping fluids in and germs out).

Burns may be caused by heat, chemicals, electrical current, and radiation. The severity of a burn depends on the:

- Temperature of the burning agent.
- Period of time that the victim was exposed.
- Area of the body that was affected.
- Size of the area burned.
- Depth of the burn.

BURN CLASSIFICATIONS

The skin has three layers:

- The epidermis, or outer layer of skin, contains nerve endings and is penetrated by hairs.
- The <u>dermis</u>, or middle layer of skin, contains blood vessels, oil glands, hair follicles, and sweat glands.
- The <u>subcutaneous layer</u>, or innermost layer, contains blood vessels and overlies the muscle and skin cells.

Depending on the severity, burns may affect all three layers of skin.

Burns are classified as first, second, or third degree depending on their severity.

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TREATING BURNS (CONTINUED) Burn Classifications

Classification	Skin Layers Affected	Signs
1 st Degree	■ Epidermis (superficial)	Reddened, dry skinPainSwelling (possible)
2 nd Degree	EpidermisPartial destruction of dermis	 Reddened, blistered skin Wet appearance Pain Swelling (possible)
3 rd Degree (Full Thickness Burns)	 Complete destruction of epidermis and dermis Possible subcutaneous damage (destroys all layers of skin and some or all underlying structures) 	 Whitened, leathery, or charred (brown or black) Painful or relatively painless

Guidelines for treating burns include:

- Removing the victim from the burning source. Put out any flames and remove smoldering clothing unless it is stuck to the skin.
- Cooling skin or clothing, if they are still hot, by immersing them in cool water for <u>not more</u> than 1 minute or covering with clean compresses that have been wrung out in cool water. Cooling sources include water from the bathroom or kitchen; garden hose; and soaked towels, sheets, or other cloths. Treat all victims of third-degree burns for shock.
- Covering loosely with dry (or moist, based on local protocols), sterile dressings to keep air out and prevent infection.
- Elevating burned extremities higher than the heart.
- <u>Do not</u> use ice. Ice causes vessel constriction.
- Do not apply antiseptics, ointments, or other remedies.
- <u>Do not</u> remove shreds of tissue, break blisters, or remove adhered particles of clothing. (Cut burned-in clothing around the burn.)

Infants, young children, and older persons, and persons with severe burns, are more susceptible to hypothermia. Therefore, rescuers should use caution when applying cool dressings on such persons. A rule of thumb is do not cool more than 15 percent of the body surface area (the size of one arm) at once, to prevent hypothermia.

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TREATING BURNS (CONTINUED)

In the next section, you will learn to treat other injuries that are common after disasters:

- Lacerations
- Amputations and impaled objects
- Fractures, dislocations, sprains, and strains
- Nasal injuries
- Hypothermia

WOUND CARE

This section will focus on cleaning and bandaging to control infection:

The objectives of treatment for wounds are to:

- Control bleeding.
- Prevent secondary infection.

The focus of this section is on cleaning and bandaging, which will help to control infection.

Wounds should be cleaned by irrigating with water, flushing with a mild concentration of soap and water, then irrigating with water again.

You should <u>not</u> scrub the wound. A bulb syringe is useful for irrigating wounds. In a disaster, a turkey baster may also be used.

When the wound is thoroughly cleaned, you will need to apply a dressing and bandage to help keep it clean and control bleeding.

The difference between a dressing and a bandage is that:

- A dressing is applied directly to the wound.
- A bandage holds the dressing in place.

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Wound Care (Continued)

If a wound is still bleeding, the bandage should place enough pressure on the wound to help control bleeding without interfering with circulation.

Follow these rules:

1. In the absence of active bleeding, dressings must be removed and the wound must be flushed and checked for signs of infection at least every 4 to 6 hours.

Signs of possible infection include:

- Swelling around the wound site.
- Discoloration.
- Discharge from the wound.
- Red striations from the wound site.
- 2. If there is active bleeding (i.e., if the dressing is soaked with blood), redress <u>over</u> the existing dressing and maintain pressure and elevation to control bleeding.

If necessary based on reassessment and signs of infection, change the treatment priority.

AMPUTATIONS

The main treatments for an amputation (the traumatic severing of a limb or other body part) are to:

- Control bleeding.
- Treat shock.

When the severed body part can be located, CERT members should:

- Save tissue parts, wrapped in clean material and placed in a plastic bag, if available.
- Keep the tissue parts cool.
- Keep the severed part with the victim.

IMPALED OBJECTS

You may also encounter some victims who have foreign objects lodged in their bodies—usually as the result of flying debris during the disaster.

When a foreign object is impaled in a patient's body, you should:

- Immobilize the affected body part.
- Not attempt to move or remove the object unless it is obstructing the airway.

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WOUND CARE (CONTINUED)

- Try to control bleeding at the entrance wound without placing undue pressure on the foreign object.
- Clean and dress the wound. Wrap bulky dressings around the object to keep it from moving.

TREATING FRACTURES, DISLOCATIONS, SPRAINS, AND STRAINS

The objective when treating a suspected fracture, sprain, or strain is to immobilize the injury and the joints immediately above and below the injury site.

Because it is difficult to distinguish among fractures, sprains, or strains, if uncertain of the type of injury, CERT members should treat the injury as a fracture.

FRACTURES

A fracture is a complete break, a chip, or a crack in a bone. There are several types of fractures:

- A <u>closed fracture</u> is a broken bone with no associated wound. First aid treatment for closed fractures may require only splinting.
- An <u>open fracture</u> is a broken bone with some kind of wound that allows contaminants to enter into or around the fracture site.



Closed Fracture

Open Fracture

Closed Fracture in which the fracture does not puncture the skin.

Open Fracture in which the bone protrudes through the skin.

Open fractures are more dangerous because of the risk of severe bleeding and infection. Therefore, they are a higher priority and need to be checked more frequently.

When treating an open fracture:

- Do not draw the exposed bone ends back into the tissue.
- Do <u>not</u> irrigate the wound.

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TREATING FRACTURES, DISLOCATIONS, SPRAINS, AND STRAINS (CONTINUED)

You should:

- Cover the wound with a sterile dressing.
- Splint the fracture without disturbing the wound.
- Place a moist 4" x 4" dressing over the bone end to keep it from drying out.

Displaced fractures may be described by the degree of displacement of the bone fragments. If the limb is angled, then there is a <u>displaced fracture</u>.

<u>Nondisplaced fractures</u> are difficult to identify, with the main signs being pain and swelling. Treat a suspected fracture as a fracture until professional treatment is available.



Displaced Fracture

Nondisplaced Fracture

Displaced fracture in which the fractured bone is no longer aligned.

Nondisplaced fracture, in which the fractured bone remains aligned.

DISLOCATIONS

Dislocations are another common injury in emergencies.

A dislocation is an injury to the ligaments around a joint that is so severe that it permits a separation of the bone from its normal position in a joint.

The signs of a dislocation are similar to those of a fracture, and a suspected dislocation should be treated like a fracture.

You should <u>not</u> try to relocate a suspected dislocation. Immobilize the joint until professional medical help is available.

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TREATING FRACTURES, DISLOCATIONS, SPRAINS, AND STRAINS (CONTINUED) SPRAINS AND STRAINS

A sprain involves a stretching or tearing of ligaments at a joint and is usually caused by stretching or extending the joint beyond its normal limits.

A sprain is considered a partial dislocation, although the bone either remains in place or is able to fall back into place after the injury.

The most common signs of a sprain are:

- Tenderness at the site of the injury.
- Swelling and/or bruising.
- Restricted use, or loss of use.

The signs of a sprain are similar to those of a nondisplaced fracture. Therefore, do <u>not</u> try to treat the injury other than by immobilization and elevation.

A strain involves a stretching and/or tearing of muscles or tendons. Strains most often involve the muscles in the neck, back, thigh, or calf.

In some cases, strains may be difficult to distinguish from sprains or fractures. When uncertain whether an injury is a strain, sprain, or fracture, treat the injury as if it is a fracture.

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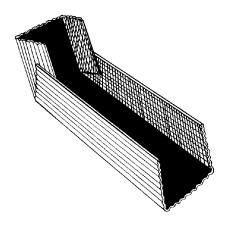
SPLINTING

Splinting is the most common procedure for immobilizing an injury.

Cardboard is the material typically used for "makeshift" splints but a variety of materials can be used, including:

- Soft materials. Towels, blankets, or pillows, tied with bandaging materials or soft cloths.
- Rigid materials. A board, metal strip, folded magazine or newspaper, or other rigid item.

<u>Anatomical splints</u> may also be created by securing a fractured bone to an adjacent unfractured bone. Anatomical splints are usually reserved for fingers and toes but, in an emergency, legs may also be splinted together.



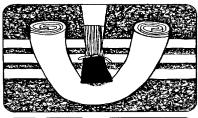
Cardboard Splint

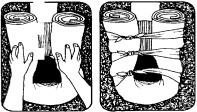
Cardboard Splint in which the edges of the cardboard are turned up to form a "mold" in which the injured limb can rest.

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SPLINTING (CONTINUED)





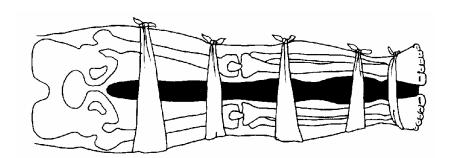
Splinting Using a Towel

Splinting using a towel, in which the towel is rolled up and wrapped around the limb, then tied in place.



Pillow Splint

Pillow splint, in which the pillow is wrapped around the limb and tied.



Splinting Using A Blanket

Splinting using a blanket in which the victim's legs are immobilized by tying blankets at intervals from mid-thigh to feet.

The guidelines for splinting include:

- 1. Support the injured area above and below the site of the injury, including the joints.
- 2. If possible, splint the injury in the position that you find it.
- 3. Don't try to realign bones or joints.
- 4. After splinting, check for proper circulation (warmth, feeling, and color).
- 5. Immobilize above and below the injury.

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SPLINTING (CONTINUED)

With this type of injury, there will be swelling. You should remove restrictive clothing, shoes, and jewelry when necessary to prevent these items from acting as tourniquets.

EXERCISE: SPLINTING

Purpose: This exercise allows you to practice the procedures for splinting.

Instructions: Follow the steps below to complete this exercise:

- 1. Working in two-person teams, one person will be the victim and one person will be the rescuer.
- 2. Victims should lie on the floor on their backs or sit in a chair.
- 3. The rescuer should apply a splint on the victim's upper arm using the procedure demonstrated earlier. Then, the rescuer should apply a splint to the victim's lower leg.
- 4. The victim and the rescuer should change roles.

NASAL INJURIES

Bleeding from the nose can be caused by:

- Blunt force to the nose.
- Skull fracture.
- Nontrauma-related conditions such as sinus infections, high blood pressure, and bleeding disorders.

A large blood loss from a nosebleed can lead to shock. Actual blood loss may not be evident because the victim will swallow some amount of blood.

Victims who have swallowed large amounts of blood may become nauseated and vomit.

The methods for controlling nasal bleeding include:

- Pinching the nostrils together.
- Putting pressure on the upper lip just under the nose.

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Nasal Injuries (Continued)

While treating for nosebleeds, you should:

- Have the victim sit with the head slightly forward so that blood trickling down the throat will not be breathed into the lungs. Do not put the head back.
- Ensure that the victim's airway remains open.
- Keep the victim quiet. Anxiety will increase blood flow.

TREATING HYPOTHERMIA

<u>Hypothermia</u> is a condition that occurs when the body's temperature drops below normal.

Hypothermia may be caused by exposure to cold air or water or by inadequate food combined with inadequate clothing and/or heat, especially in older people.

The primary signs and symptoms of hypothermia are:

- A body temperature of 95° Fahrenheit (37° Celsius) or less.
- Redness or blueness of the skin.
- Numbness accompanied by shivering.

In later stages, hypothermia will be accompanied by:

- Slurred speech.
- Unpredictable behavior.
- Listlessness.

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TREATING HYPOTHERMIA

Because hypothermia can set in within only a few minutes, you should treat victims who have been rescued from cold air or water environments by:

- Removing wet clothing.
- Wrapping the victim in a blanket or sleeping bag and covering the head and neck.
- Protecting the victim against the weather.
- Providing warm, sweet drinks and food to conscious victims. <u>Do not offer alcohol or massage</u>.
- Placing an unconscious victim in the recovery position.
- Placing the victim in a warm bath if the victim is conscious.

Do not to allow the victim to walk around even when he or she appears to be fully recovered. If the victim must be moved outdoors, you should cover the victim's head and face.

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UNIT SUMMARY

To safeguard public health, take measures to maintain proper hygiene and sanitation, and purify water if necessary. All public health measures should be planned in advance and practiced during exercises.

Emergency medical operations includes four subfunctions:

- Triage
- Treatment
- Transport
- Morgue

Head-to-toe assessments should be verbal and hands-on. Always conduct head-to-toe assessments in the same way—beginning with the head and moving toward the feet. If injuries to the head, neck, or spine are suspected, the main objective is to not cause additional injury. Use in-line stabilization and a backboard if the victim must be moved.

Treatment areas must be established as soon as casualties are confirmed. Treatment areas should be:

- In a safe area that is close to, but uphill and upwind from, the hazard area.
- Accessible by transportation vehicles.
- Expandable.

Burns are classified as first, second, or third degree depending on severity and the depth of skin layers involved. Treatment for burns involves removing the source of the burn, cooling the burn, and covering it. For third-degree burns, always treat for shock.

The main first aid treatment for wounds consists of:

- Controlling bleeding.
- Cleaning.
- Dressing and bandaging.

In the absence of active bleeding, dressings must be removed and the wound checked for infection at least every 4 to 6 hours. If there is active bleeding, a new dressing should be placed <u>over</u> the existing dressing.

UNIT 4: EMERGENCY MEDICAL OPERATIONS—PART 2

UNIT SUMMARY (CONTINUED)

Fractures, sprains, and strains may have similar signs, and diagnosis may not be possible under disaster conditions. Treat suspected fractures, sprains, and strains by immobilizing the affected area using a splint.

HOMEWORK ASSIGNMENT

Read and familiarize yourself with Unit 5: Light Search and Rescue Operations before the next session.

Obtain a blanket for use during Unit 5.

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